

## AMENDMENT

Attorney Docket: Case 6013D

Application No. 09/894,558

Reply to Office Action of March 25, 2004

Amendments to the Specification

Please replace the paragraph which includes page 6, line 21, with the following amended paragraph:

As illustrated in Fig. 1, and proceeding in the direction of flue gas flow generated during the combustion process, the boiler installation 10 includes a furnace 12 having a gas outlet 14 which conveys flue gases, generally designated 16, to an air heater 18 used to preheat incoming air 20 for combustion. Pulverizers 22 grind a fossil fuel 24 (e.g., coal) to a desired fineness and the pulverized coal 24 is conveyed via burners 25 into the furnace 12 where it is burned to release heat used to generate steam for use by a steam turbine-electric generator (not shown). Flue gas 16 produced by the combustion process are conveyed through the gas outlet 14 to the air heater 18 and thence to various types of downstream flue gas cleanup equipment. The flue gas cleanup equipment may comprise a fabric filter or, as shown, an electrostatic precipitator (ESP) 26 which removes particulates from the flue gas 16. A flue 28 downstream of the ESP 26 conveys the flue gas 16 to a wet scrubber absorber module 30 which is used to remove sulfur dioxide and other contaminants from the flue gas 16. Flue gas 16 exiting from the wet scrubber absorber module or, simply, the wet scrubber absorber module 30, is conveyed to a stack 32 and exhausted to atmosphere. Forced draft fans 34 and induced draft fans 36 are used to propel the air 20, fuel 24, and flue gases 16 through the installation 10. For further details of various aspects of such installations 10, the reader is referred to STEAM its generation and use, 40th Ed., Stultz and Kitto, Eds., Copyright © 1992 The Babcock & Wilcox Company, particularly to Chapter 35 - Sulfur Dioxide Control, the text of which is hereby incorporated by reference as though fully set forth herein. While the aforementioned STEAM reference contains a description of one form of wet scrubber 30 produced by The Babcock & Wilcox Company (B&W) and to which the present invention is applicable, the present invention is not limited to such B&W wet scrubber designs. Persons skilled in the art will appreciate that the principles of the present invention apply equally well to other types of wet scrubber designs, available from other manufacturers.

Please replace the paragraph which includes page 7, line 22, with the following amended paragraph:

Referring now to Fig. 2 in particular, there is shown an embodiment of a system for accomplishing the method of injecting small amounts of  $H_2S$  into flue gas for mercury removal according to the present invention. An  $H_2S$  generation system, generally referred to as 50, is provided and includes a well-stirred tank containing a liquid section 54 comprising sodium and/or potassium sulfide and a gas section 52 where air and  $H_2S$  are mixed and the mixture 74 of air and  $H_2S$  is transferred to an injection apparatus 76, described *infra*. The  $H_2S$  vapor pressure in the tank 51 is controlled by pH. The pH in the tank 51 liquid solution 54 is controlled by the addition of a strong mineral acid 56, such as hydrochloric or sulfuric acid ( $HCl$  or  $H_2SO_4$ ) from a tank or container 58, or by the addition of an alkali solution 57 such as sodium carbonate or sodium hydroxide ( $NaOH$  or  $Na_2CO_3$ ) from a tank or container 85. The acid is added to lower the pH and increase the  $H_2S$  vapor pressure in tank 51. The alkali is added to raise the pH and lower the  $H_2S$  vapor pressure in tank 51. The  $H_2S$  produced is immediately transported to the injection system or injection apparatus 76. This is an inherent safety feature since no gaseous  $H_2S$  is allowed to accumulate. Stirring or mixing means, advantageously comprising a motor 64

## AMENDMENT

Attorney Docket: Case 6013D

Application No. 09/894,558

Reply to Office Action of March 25, 2004

---

and driven stirring shaft with two paddles 66, keep the tank sections 52 and 54 well stirred. As a result, the constituents in the liquid zone or liquid section 54 are well mixed to yield the H<sub>2</sub>S at the desired vapor pressure and the air 68 and generated H<sub>2</sub>S are well mixed in the gas section 52. Pumping means 60 conveys the mineral acid 56 to the tank 51 via line 62; pumping means 61 conveys the alkali solution 57 to the tank 51 via line 63. Suitable control valves in lines 62 and 63 would be used as needed to control the flow of acid 56 and alkali 57.

Please replace the paragraph which includes page 9, line 3, with the following amended paragraph:

As described earlier and as illustrated in Fig. 6, the present invention is also applicable to combustion systems employing dry scrubbers for flue gas desulfurization. Again, like reference numerals designate the same or functionally similar parts. Flue gas 16 produced by the combustion process are conveyed through the gas outlet 14 to the air heater 18 and thence to various types of downstream flue gas cleanup equipment. A flue 28 conveys the flue gas 16 to a dry scrubber absorber module or dry scrubber 150 which is used to remove sulfur dioxide and other contaminants from the flue gas 16. Flue gas 16 exiting from the dry scrubber 150 is conveyed to a fabric filter or, as shown, an electrostatic precipitator (ESP) 26 which removes particulates from the flue gas 16 and then the flue gas 16 is conveyed to a stack 32 and exhausted to atmosphere. A waste disposal system 160 can also be included to handle unwanted materials from the ESP 26 and/or the dry scrubber 150. Forced draft fans 34 and induced draft fans 36 are used to propel the air 20, fuel 24, and flue gases 16 through the installation 10 as before.